Applicants' representative maintains the prior traversal of the rejections as previously set forth in the prior responses to Paper No. 6. The presently pending claims are patentably distinct over the references cited. There is no suggestion or motivation to combine the references as suggested by the Examiner.

Moreover, the two previously filed declarations (one by co-inventor – D. Mauer, the other by an Audi employee) provide significant evidence of secondary considerations in favor of nonobviousness. The Examiner has not given these declarations their proper significance. Notwithstanding, certifications of accuracy by the translators for the Audi deceleration and its attachment 1 are being filed herewith. This is not new evidence (since the translations are essentially the same as those previously filed, except for possibly a word or two), and is merely a procedural detail for the certification. Reconsideration and withdrawal of the rejections are respectfully requested.

Respectfully submitted,

Dated: Oct. 10, 2002

By: _____
Monte L. Falcoff
Reg. No. 37,617

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

[Translation from German]

AUDI declaration regarding the Emhart Tucker company's self-piercing rivet system patent application

I hereby make the following statement:

1. I am now and have for many years been an employee of Audi AG.

2. The firm of Emhart Tucker has to my knowledge put more than 100 self-piercing rivet system into service in Vehicle Project A2 at the Neckarsulm Audi plant.

3. The Tucker self-piercing rivet systems are based on an electric motor drive triggering a linear ram motion by way of a rotary motion, guiding a self-piercing rivet in the direction of the sheets to be connected.

4. On the basis of the decision to implement this technology, I was involved in the procurement of these self-piercing rivet systems (involved personally in the form of executing signatures for contracts/orders)

5. Audi procured these electric motor systems on the basis of a system comparison with a bidder on hydraulic self-piercing rivet systems, the decision as to which systems to procure being dependent on the circumstances of use in each case.

6. The decision to procure electric-motor Tucker self-piercing rivet systems was documented/supported in a purely technical manner, and not influenced by advertising, special marketing or price considerations (price equality of types). (See also attached 'Electric Motor/Hydraulic System Comparison.')

7. In the field of electric motor self-piercing rivet systems, no other offerer was active, viz. to Audi's knowledge also there was and is no one else who has this technology. Still, the firm of Emhart Tucker has brought the imaging of the process data, the requisite sensory system and the control technology to a high level, in terms of the circumstances of employment. The technology here employed is not to our knowledge usable for other, e.g. hydraulic, systems.

8. Clinch and self-piercing rivets are different techniques/processes, and in their result for the connection of metal sheets they are not interchangeable without adjustment of the requisite boundary conditions.

9. I am of opinion that the development of the electric motor self-piercing rivet system technology as carried on by Tucker to Audi's requirements will also enjoy good economic success in the longer term, the collaboration between the two firms having brought this development to the point of mass production.

TRANSLATION ACES INC.
29 Broadway ◆ Suite 2301
New York, NY 10006-3279
Tel. (212) 269-4660 ◆ Fax (212) 269-4662

AFFIDAVIT OF ACCURACY)
)
STATE OF NEW YORK) ss.:
)
COUNTY OF NEW YORK)

I, the undersigned, being duly sworn, depose and state:

I am qualified to translate from the German language into the English language by virtue of being thoroughly conversant with these languages and, furthermore, having translated professionally from German into English for more than 10 years;

I have carefully made the translation appearing on the attached and read it after it was completed; and said translation is an accurate, true and complete rendition into English from the original German -language text, and nothing has been added thereto or omitted therefrom, to the best of my knowledge and belief.

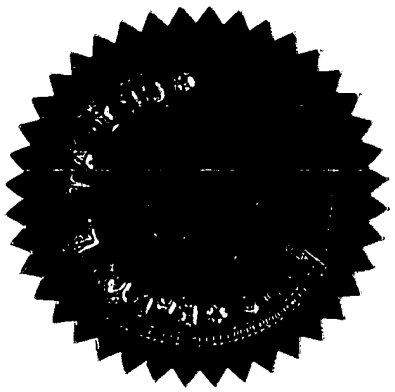
Ernst van Haagen

TRANSLATION ACES, INC.
Ernst van Haagen

Subscribed and sworn to before me
this 9th day of October , 2002.

Karyn L. Tasens

KARYN L. TASENS
Notary Public, State of New York
No. 31-4680695
Qualified in New York County
Commission Expires Oct. 31, 20 2



AUDI-Erklärung zur Pat ntanmeldung Stanzni tsystem Fa. Emhart Tucker

Hiermit erkläre ich wie folgt:

1. Ich bin zur Zeit und seit vielen Jahren Mitarbeiter der AUDI AG

2. Die Fa. Emhart Tucker hat nach meiner Kenntnis mehr als 100 StanznietSysteme im Fahrzeug-Projekt A2 im Werk AUDI- Neckarsulm zum Einsatz gebracht.

3. Die Tucker-Stanznietsysteme basieren auf einem elektromotorischen Antrieb, der über eine Drehbewegung eine lineare Stempelbewegung auslöst, bei der ein Stanzniet in Richtung der zu verbindenden Bleche geführt wird.

4. Basierend auf der Entscheidung, diese Technik einzusetzen, war ich an der Beschaffung dieser Stanznietsysteme beteiligt (persönlich beteiligt in Form der Unterschriftsleistung für die jeweiligen Aufträge/Bestellungen).

5. AUDI beschaffte diese elektromotorischen Systeme auf der Basis eines SystemVergleichs mit einem Anbieter für hydraulische Stanznietsysteme, wobei die Festlegung, welche Systeme zu beschaffen sind, vom jeweiligen Einsatzfall abhängig waren.

6. Die Entscheidung, elektromotorische Tuckerstanznietsysteme zu beschaffen, wurde rein technisch belegt/gestützt und nicht durch Werbung, besonderes Marketing

oder preisliche Vorteile beeinflusst (Preisgleichheit der Ausführungen). (Siehe hierzu auch die Anlage
'Systemvergleich elektromotorisches / hydraulisches System')

7. Im Bereich der elektromotorischen Stanznietsysteme war kein weiterer Anbieter tätig bzw. gab und gibt es auch nach Kenntnisstand AUDI keinen weiteren mit dieser Technik. Dennoch hat Fa. Emhärt Tucker die Abbildung der Prozess-Daten, die erforderliche Sensorik und die Steuerungstechnik auf ein hohes Niveau gebracht, bezogen auf die Einsatzfälle. Die hier eingesetzte Technik lässt sich nach unserem Kenntnisstand nicht für andere z. B. hydraulische Systeme einsetzen.

8. Clinchen und Stanznieten sind unterschiedliche Techniken/Prozesse und in ihrem Ergebnis bei der Verbindung von Blechen nicht ohne Änderung der erforderlichen Randbedingungen austauschbar.

9. Ich bin der Ansicht, dass die von Tucker nach den Anforderungen von AUDI getriebene Entwicklung der elektromotorischen Stanznietsystemtechnik auch in der weiteren Sicht zu einem guten wirtschaftlichen Erfolg führen wird wobei die Zusammenarbeit der beiden Firmen die Entwicklung zur Serienreife geführt hat.

[Translation from German]

AUDI declaration regarding the Emhart Tucker company's self-piercing rivet system patent application / attachment 1

I/PG-223 Recommendation List for SNZ-Systems

		electric	hydraulic
Technical recommendation	**Application**		
	tool on robot	X	X
	tool replacement at robot	X	
	stationary tool operated by robot	X	X
	tool – hand-held, 3 series rivet		X
	tool – hand-held, 5 series rivet		X
	stationary tool – manually operated, cycle time --> **not** critical	X	X
	stationary tool – manually operated, cycle time --> critical		X
Deviations due to interfering contours	**Possible Deviations**		
	strokes > 70 mm		X
	rivet holder length 20 mm fixed		X
	variable rivet holder length 10 or 30 mm	X	
	the outer interfering contours must be allowed for in every case	X	X
Deviations due to product requirements	Pressure pad adjustability (pressure)		X
	Soft pressure pad (of plastic, for exterior paneling)	X	
	Quality requirements / curve monitoring	X	
	Stroke speed / process time		X
	rivet size 5 x 5 / 5 x 6.5		X
Other decision grounds	(oil-resistant bottom coat not required etc.)	X	
	low noise level	X	
	guarantee on power unit > 1 million cycles	X	
	guarantee on C-clamps > 7.5×10^6 cycles	X	
	on-site service SOP – 1 year after SOP	X	
	intervention in control system is possible		X
	stop when riveting without rivet	X	
	stop when riveting without sheet metal	X	

TRANSLATION ACES INC.
29 Broadway ◇ Suite 2301
New York, NY 10006-3279
Tel. (212) 269-4660 ◇ Fax (212) 269-4662

AFFIDAVIT OF ACCURACY

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

I, the undersigned, being duly sworn, depose and state:

I am qualified to translate from the German language into the English language by virtue of being thoroughly conversant with these languages and, furthermore, having translated professionally from German into English for more than 10 years;

I have carefully made the translation appearing on the attached and read it after it was completed; and said translation is an accurate, true and complete rendition into English from the original German-language text, and nothing has been added thereto or omitted therefrom, to the best of my knowledge and belief.

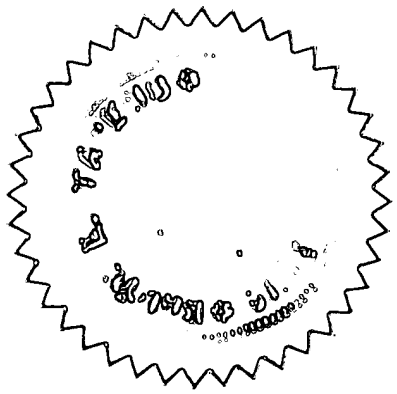
Robin Esterberg

TRANSLATION ACES, INC.
BERTRAND LANGUAGES INC.
Robin Esterberg

Subscribed and sworn to before me
this 9th day of October , 2002.

Karyn L. Tasens

KARYN L. TASENS
Notary Public, State of New York
No. 31-4680695
Qualified in New York County
Commission Expires Oct. 31, 20_



AUDI-Erklärung zur Patentanmeldung Stanznietsystem Fa. Emhart Tucker /Anlage 1

I/PG -223 Empfehlungslist für SNZ - System

		elektrom.	hydraulisch
Technische Empfehlung	**Einsatzfall**		
	Zange am Roboter	✓	✓
	Zangenwechsel am Roboter	✓	
	Stat. Zange vom Roboter bedient	✓	✓
	Zange - handgeführt, 3er Niet		✓
	Zange - handgeführt, 5er Niet		✓
	Stat. Zange - man. bedient, Taktzeit --> unkritisch	✓	✓
	Stat. Zange - man. bedient, Taktzeit --> kritisch		✓
Abweichungen durch Störkonturen	**Mögliche Abweichungen**		
	Höhe > 70mm		✓
	Nieterhalterlänge 20mm fest		✓
	Variable Nieterhalterlänge 10 oder 30mm	✓	
	Grundsätzlich sind die jeweiligen Außenstör-konturen zu berücksichtigen	✓	✓
Abweichungen durch Produktanforderungen	Niederhaltereinstellbarkeit (Druck)		✓
	Weicher Niederhalter (Aus Kunststoff, für Außenhaut)	✓	
	Qualitätsanforderungen / Kurvenüberwachung	✓	
	Hubgeschwindigkeit / Prozeßzeit		✓
	Nietgröße 5 x 5 / 5 x 6,5		✓
Sonst. Entscheidungsgründe	(Ölfester Bodenanstrich nicht erforderlich etc.)	✓	
	geringer Lärmpegel	✓	
	Garantieleistung auf Krafterzeugniseinh. > 1Mio Zyklen	✓	
	Garantieleistung auf C-Bügel > 7,5 x 10^6 Zyklen	✓	
	Vor Ort-Service SOP - 1Jahr nach SOP	✓	
	Eingriff in Steuerung möglich		✓
	Stillstand bei Nieten ohne Niet	✓	
	Stillstand bei Nieten ohne Blech	✓	

Tuckerbeilage_Auswahl_Systemsatz.xls

[Translation from German]

(19) **FEDERAL REPUBLIC OF GERMANY GERMAN PATENT OFFICE**

(12) Letters of Disclosure
(11) 3,301,243 A1

(51) Intl. Cl.[3]: **B21 J 15/32**

(21) Serial No.: P 33 01 243.1

(22) Appln. date: 15 January 1983

(43) Discl. date: 19 July 1984

(71) Applicant:
Mannesmann AG
4000 Düsseldorf, Germany

(72) Inventor:
Karl Kinkel
6230 Frankfurt, Germany

Examination requested pursuant to §44 Pat. Act

(54) Rivet Feeding Means for a Riveting Machine

[Abstract in German and English]

15 JAN 83 3301243

Mannesmann AG
Mannesmannufer 2
4000 Düsseldorf

14 January 1983
21882 - C /Un.

Rivet Feeding Means for a Riveting Machine

Claims

1. Rivet feeding means for a riveting machine, having a rivet receptacle for separately lodged rivets of different sizes, a means of measuring thickness of material and a rivet selecting means, where after ascertaining the requisite rivet length, the corresponding rivet is supplied to the riveting head, **characterized in that** between the rivet receptacle (7) and the riveting head (9), a rivet distributor (8) adjoined to the means of measuring thickness of material and means of rivet selection is provided, in whose fixedly arranged distributing member (19) at least two hydraulic-medium actuated, movable slides (18) are provided, a passage (28) being arranged in each slide (18), into which a segment (10a) of the rivet feeding line (10) leading from the rivet receptacles (7) to the riveting head (9) opens, and said passage (28), by adjusting the slide (18), is closely adjoinable to a segment (10b) of the rivet feeding line (10) extending between the distributor (8) and the riveting head (9) and opening into the fixed distributor member (19).

2. Distributor according to claim 1, characterized in that the pressure-medium actuated slides (18) are radially guided in an annular or polygonal distributor member (19), the segment (10b) of the line (10) leading to the riveting head (9) being centrally fixed in the distributor member (19).

3. Distributor according to claims 1 and 2, characterized in that the slide (18) is movable towards the center of the distributor under the action of pressure with the aid of a first pressure-medium actuated cylinder-piston apparatus, the axially movable cylinder guided at the piston (23) being formed by a blind hole (22) running in the direction of motion of the slide (18), and the piston (23) fixedly connected to the distributor member (19), which piston (23) is provided with an axial through bore (24), is connected to a pressure-medium control line (25).

4. Distributor according to claims 1 to 3, characterized in that the slide (18) is fixedly connected to the piston (27) of a second pressure-medium actuated cylinder-piston unit whose cylinder is formed by a bore (31) arranged in the distributor member (19), the surface of the piston (27) acted upon continuously by a constant volume flow of pressure medium and facing the center of the distributor being smaller than the affected surface of the first cylinder-piston apparatus (22, 23) facing away from the center of the distributor.

5. Distributor according to claims 1 to 4, characterized in that the line segment (10a) joined to the slide (18) is movable in common with the slide (18).

6. Distributor according to claims 1 to 4, characterized in that the movable line segment (10a) is inserted in an opening (32) provided in the cover (26) of the distributor member (19), and in that the opening (32) is connectable through the passage (28) provided in the slide (18) to the line segment (10b) fixed in the distributor member (19).

The invention relates to a distributor for a pneumatic rivet feeding means on a riveting machine, attached to a rivet receptacle with separately lodged rivets of various sizes, where after determination of the required rivet length, the corresponding rivet is supplied to the riveting device.

There are known mechanical (US Pat. 3,190,104) or pneumatic (DE OS 3,123,581.6) riveting devices employed for riveting materials of different thicknesses. When using different rivets, the riveting device must be partially rebuilt or at least modified, as known in the practice of aircraft construction.

The object of the invention is to discover a distributor for a pneumatic rivet supplying means on a riveting machine, joined to separate receptacles for rivets of different dimensions, where after determination of the required rivet length, the corresponding rivet is supplied to the riveting device, which distributor, of simple construction and simple to handle, automatically selects the rivet and, reliably and automatically, accomplishes its transfer to the supply line of the riveting device. This object is accomplished by the characterizing part of the principal claim. Advantageous modifications are specified in the subsidiary claims.

With the device according to the invention, it is possible to accomplish the delivery of the required rivet to the riveting device simply and reliably. After the determination of the dimension for the length of the rivet, which is performed directly in the neighborhood of the riveting head, an impulse is transmitted to the distributor, which selects the required rivet and passes it on to the riveting device. The distributor is actuated either by compressed air or by a hydraulic medium; sources of pressure medium that are in any case present on riveting machines

may be employed. The structure of the distributor prevents spreading of the rivets because the supply line from the rivet receptacle is connected to the continuation of the line inside the distributor without transition.

An embodiment of the invention is represented by way of example in the accompanying drawings.

In the drawings,

Fig. 1 shows a riveting machine having the rivet distributor according to the invention,

Fig. 2 shows the riveting device on the riveting machine according to Fig. 1, together with the supply line for rivets,

Fig. 3 shows the riveting device according to Fig. 2 carrying out the riveting operation,

Fig. 4 shows a distributor according to the invention in top view,

Fig. 5 shows a section of the distributor according to Fig. 4, and

Fig. 6 shows a modification of the distributor according to the invention, represented in axial section.

As Fig. 1 shows, 1 designates a switch cabinet, 2 is a monitor, 3 a video camera and 4 a point-of-light lamp. By means of this optic-electronic apparatus 1, 2, 3, 4, the thickness of the parts to be riveted is measured. The value obtained is coordinated in each instance with a rivet dimension. The impulses from the optic-electronic apparatus are transmitted to a preselection counter connected to a rivet receptacle 7, or to the distributor 8.

The preselection counter (not shown) is set, in this example, for six counter units, corresponding to the several rivet lengths.

A hydraulic-medium driven riveting head 9 is attached to the frame of the riveting machine. The hydraulic medium comes from the hydraulic oil producer 5. 6 designates a chip aspirator, likewise connected by a line to the riveting head 9.

The rivet supply means 7 and the distributor attached thereto are connected to the riveting head 9.

Fig. 2 schematically represents a portion of the riveting head 9 and also the supply line 10 with a rivet 11. 12 designates the parts to be riveted. They are supported on a working cylinder 16 of a pressure-medium actuated cylinder-piston unit. To the piston 14 of this unit, a ram 15 is connected, which during the riveting operation is run upwards and serves to form the closure head. The dolly is designated 13 and the guide 17. The guide 17 of the riveting device rests on the material to be riveted.

The position of the riveting device in the riveting operation is shown in Fig. 3. The ram 15 is located in the extended position, and the dolly 13 with rivet 11 is guided in the guide 17.

Fig. 4 shows the distributor 8, which is in the shape of a squat cylinder. In the distributor member 19, six pressure-medium actuated slides 18 are arranged radially. Into each slide, a segment 10a of the pressure-medium line 10 opens, leading from the rivet receptacle 7 (Fig. 1) to the riveting device 9. This segment 10a is closely adjoinable by shifting the slide to an additional segment 10b of the line 10, extending between the distributor 8 and the riveting head 9 and

opening into the stationary distributor member 19. In the adjoined position, the cross-section of the two segments 10b and 10a coincide.

The structure of the distributor 8 is better illustrated with reference to Fig. 5. The line segment 10b is fixed in the distributor member 19 by way of a sleeve 20 fixedly arranged in the center of the distributor member 19.

For the slide 18, fitted guideways are milled in the distributor member 19.

The slide 18 is movable with the aid of a pressure-medium actuated cylinder-piston apparatus towards the center of the distributor, after overcoming a backpressure. The cylinder is formed by a bore 22 arranged in said slide and running in the direction of the radial motion of the slide 18. The piston 23 is fixedly connected to the distributor member 19. This piston is provided with an axial through bore 24 connected to a pressure-medium control line 25. When pressure medium is supplied by way of a control valve not shown, the cylindrical surface of the blind hole is acted upon, and the slide 18 moves towards the center of the distributor 8. Thus the slide is guided along the walls of the guideways 21 arranged in the distributor member 19, or along the cover 26 of the distributor member 19.

As may also be seen in Fig. 5, the slide 18 is fixedly connected by way of a rod 30 to the piston 27 of a second pressure-medium actuated cylinder-piston apparatus acting away from the center of the distributor. The piston area of the piston 27, acted upon by a continuous, invariable volume flow of pressure medium, is smaller than the affected area of the first cylinder-piston apparatus 22, 23. The rod 30 at the same time serves as a stop for the piston 27 vis-à-

vis the wall of the distributor member 19. The cylinder of this second apparatus is formed by a bore 31 arranged in the distributor member 19.

The line segment 10a connected to the slide 18 is movable together with the slide 18 in the embodiment represented in Fig. 5.

Fig. 6 shows a modification. Specifically, the line segments 10a are inserted in openings 32 provided in the cover 26 of the distributor member 19. These openings 32 are connectable by way of a passage 28 arranged in the slide 18 to the line segment 10b fixed in the distributor member 19.

After the required rivet length, as already described, has been determined by an optical-electrical means, this means transmits pulses for the rivet receptacle 7 or distributor 8, whereafter the appropriate slide 18 is actuated and establishes the connection of the line segments 10a and 10b. Each of the slides 18 is connected to a receptacle compartment in which rivets of like length are held. After establishing of the through connection of the rivet receptacle 7 by way of the distributor 8 to the riveting device 9, the selected rivet is carried to the riveting head 9 by the line 10.